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An Inaugural Dissertation on "The Digestive Mucous Membrane"

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by

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Physiology and Pathology may be regarded as the groundworks of Medicine. Without a knowledge of function in its healthy state, and its changes and sympathies in an abnormal condition, the physician can but ill understand the complications of disease, or aspire in their treatment, beyond empiricism. To a neglect of this maxim, much may be attributed of the wild vagaries, and absurd hypotheses which have characterized the medical profession from the days of Hippocrates to the present, and which have afforded fruitful themes for the ridicule of Pliny, Lesage, Moliere, and such others as have chosen medicine, or

its cultivators as the subject of their mirth. The friend of humanity will find a painful task, in reviewing the annals of our science, and in tracing it through the "darksome past" to its more enlightened day. Oppressed by usurped authority, or trammeled by vague doctrines, Medicine anterior to the present century, had but little claim to the rank of a certain science. But with what complacency may we dwell upon the productions of our own age! The advancement of physick is unparalled. Within the last few years, humoralism and hypothetical Medicine have lost their former authority, and upon the basis of solidism, has been erected the beautiful "doctrine of tissues".

The first conception of this doctrine which has since incorporated Anatomy,

Physiology and Pathology, formerly regarded as three, in one connected whole, is conceded to Bordeu and Macbride. To Pinel & Bichat, however, is most probably due the honour of its present existence; the former being the first to classify disease, according to the tissue in which it was situated; and the latter to consider these tissues in their physiological connexions.

Bichat in his work on General Anatomy, has evinced a laborious research, by which those grand truths were demonstrated, that will forever entitle him to the regard of the philosopher, and the gratitude of the human family. The general circulation given to this work, and the numerous respectable authors who have appeared in its defence, and made it the foundation of their pathological views, sufficiently attest the esteem in which it is held by the Medical community. With re-

gard to the opposition which these doctrines have encountered, it may with safety be said, that as little has been manifested towards them as towards any other truths of equal magnitude. All, however lucid they may be, have to contend with prejudice. Age, jealous of innovation, yields with reluctance the impressions of youth, nor will a nation readily submit to be taught by a rival nation. (See Note.) We might here also notice another class of gentry, always to be met with, who would rather scoff than learn, in order that we may pay them their well merited

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Note. Mr. Charles Bell in his work on the nervous system (page 163) speaking of the doctrines of Bichat and others of the continental physiologists has this remark,– "When the popularity of these doctrines is considered, it may easily be conceived how difficult it has been, during

compliment "Rise in, as my lord must."

It has not yet dawned upon me that the object under consideration is to signalize the premier to the indignant, when by the lights among you it, a intelligent physician shall be found declaring consciences "causa latet res est not plana", when we shall meet disease as a well known enemy, and combat it with equal calmness.

The growing number of our medical societies, important bodies, keep my hopes to the sanguine, as our great consummation. We are at a time that has passed, may anything be distinguished from the age. Discussions of the same kind, follow up our queries by experiments; but it is evident that such discussions have commenced in the latinus of the Germans and Russians."

as preliminary some observations on that part of Bichat's division, which he has given the name of the mucous system.

The tissues and the internal organs which have a communication with the external envelope or skin. It embraces two distinct continuous surfaces; the one gastro-pulmonary, the other genito-urinary. Each of these as their names would indicate, is again subdivided, the former into that lining the lungs, and that with which in this essay we have principally to do, viz. the respiratory mucous membrane.

A moment's reflection will serve, indeed to convince us, of the vast importance of this part of the mucous system in the animal economy, and of its liability owing to its extent, situation, function and sympathetic to morbid action. Lining the entire alimentary

canal, from the mouth to the rectum, and at take place the grand phenomena of digestion, secretion, excretion, and even absorption no one of which can be deranged without detriment to the individual.

Structure. The digestive mucous membrane is composed of two laminæ. The one to which it owes its consistence, texture and character, has been named corion. In this we find a great analogy to the cutis vera of the skin, and hence it is frequently called cutis mucosa. The other is the villous, so termed from its hexangular form resembling it, and which gives it a velvet like appearance, whence its name. Upon these two laminæ likewise it is said may be remarked two surfaces, the attached, formed by the former, and the free by the latter. The corion is connected to the muscular coat, by means of a dense cellular structure, which

gives form to the intestine, and is the seat of the mucous glands. Experiment has demonstrated, that when this is removed from any part of the lower extremity, the other coats are the consequence — a circumstance not attendant upon the removal in a like manner of the other tissues. It has been contended by some, that this is essentially a part of the mucous membrane and should rather be considered as a layer of it, than as a different tissue. By its kind of connexion with the muscular coat, no fatter is brought into play, so as to induce the peristaltic motion of the bowels, in which foreign bodies are expelled, and the functions promoted.

The free surface of the mucous membrane is kept in a state of constant humidity, by the fluid which gives it its name. This is furnished by the numerous muciparous glands which

exist throughout the alimentary canal, and upon its external surface: it seems to prevent the tissues from being injured by the deleterious bodies, with which it is incessantly exposed. Hence we find the mucus abundantly secreted in health, when these tissues are longest delayed, or when they are of a stimulating character. In its natural state, when healthy, mucus is invariably found in the intestines in presence of substances, which if injected into the cellular structure, would give rise to purulent abscesses, or fistulous openings.

When this surface is examined, we find on it the villi above mentioned; these have their origin in the cellular and have been supposed to be modifications of the papillæ, which are based on the sub mucous coat. Microscopical investigation shows them to consist of an artery, vein, and lymphatic vessel,

and in union by areolar substance. In the upper part of the small intestine these villi have been computed by Meckel to be about four thousand in number on every square inch. As we descend in our investigation towards its lower extremity, we find them becoming less evident, and in the large intestine, their demonstration is so difficult that some anatomists have denied their existence. They are larger in some parts of the alimentary canal than in others, they are very apparent in the mouth, stomach, small intestines, and gall bladder, and are called after the names of those anatomists who were the first to call attention to them. In other parts of the mucous system, they are not so readily demonstrated.

The corion, the soft spongy substance which gives thickness to the membrane, is not throughout of uniform density; in this respect

it is made to vary with age, sex, situation, and condition, and also with regard to distention or collapse. In the stomach it is of its maximum thickness, in the small intestines it is thicker at its superior portion, of medium consistence throughout and easily detached from the cellular coat. In the large intestines though, it is comparatively thicker in the vicinity of the valve of the colon, and near the inferior portion; yet when traced, it is found thinner, to be of the consistence than in the small intestines.

It is soft and pulpy in infancy, increases in density as age advances, but in some cases in old persons, it again becomes soft as in childhood.

In the superior part of the alimentary canal, the mucous membrane is thrown into folds or plicæ; forming in the small intestines the valvulæ conniventes. In the large this

arrangement does not exist.

Appearance of the Mucous Membrane in health. Much diversity of opinion has occurred with regard to the colour of the membrane in its healthy condition:— Navalier calls it a cadaver purple; Bichat reddish, Gavard gray tinging to red; Boyer grayish with a shade of yellow or red; Chaussier, Gilbert and Cloquet marbled red, Andral, with brown or blackish spots, and Bouillaud varying from white to red.

Much of this discrepancy is supposed to proceed from the membrane being moved under different circumstances, as during dissection or pushing (See Note.) in a moistened or sound state. Perhaps too not a little of it arises from different names

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Note. In allusion to this point we may introduce the following experiments, made at the commencement of a series which was unavoidably ended.

being given to the same shade through a variety of reference to a proper standard of colours. The body at death the last organs of by the recently of certain organs the nature of the matter contained in the canal the time which has elapsed since death took place, the position given to the body, (particularly whilst it was warm) the contact of air or all so many causes capable of altering the appearance of the digestive mucous tissue.

<u>Experiment 1st.</u> A full grown rabbit was killed by a blow on the neck, after being made to fast fifty four hours. Ten minutes afterwards the abdomen was opened and the intestinal canal taken out. The stomach being laid open, exhibited rugæ at its cardiac portion - centre nearly smooth. The colour of the first or rugous portion of a dull yellow, alternating with a pale red or rose. When held to the light it exhibited some within an irre-

Mr. Rousseau has published in the Archives Générales de Médecine numerous satisfactory experiments to show that the healthy mucous membrane is acrid after death. In this he has been sustained by many recent observations, particularly by those of Drs. Lonnand & Velland. We shall state here some of the results of this latter gentleman.

The colour of the stomach in the adult, is usually whitish, that of the duodenum and jejunum, white, verging to ash colour. This ash colour

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descent always corresponding with the coats of the vessels as seen through the serous coat. In the latter being removed, the vessels were seen minutely ramifying in the subjacent tissue. Viewed from within the eye could discover very light red shades, rather than distinct vascular ramifications. Small intestine at its upper portion

fermentation at the conclusion of the ileum and the membrane becomes wider in the great intestine. Yellow patches are sometimes observed, which he thinks not inconsistent with a good state of health.

In the embryo and fœtus the membrane is rose colored, except in the large intestines where it is generally green, an appearance attributed to the meconium.

In infancy, it is of a milk white.

To corroborate this, we may introduce the statement of Ed. Tenn. that in the bodies of infants, who have died during parturition and were

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stained internally longitudinal streaks of ash colour alternating with rose. Arborization seen from within as in the case of the stomach. The mucous coat on account of its softness, could only be separated by scraping; when removed, the vascular ramifications were seen in the serous

examined immediately after, it has always found this membrane perfectly entire, or rose-coloured, throughout its whole extent.

In adolescence, it is of a less brilliant white, and in the adult of a white verging to ash. In elderly persons more strikingly ash. That it is in extreme old age we are not told.

During digestion, there is a sudden and transient rise, first to the stomach and duodenum, and sometimes to the commencement of the jejunum, inducing a red colour. This may be observed after death.

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tissue. The mucous coat was detached from the vascular branches as seen in the serous, it was dotted and delicately spread. Later when washed, colourless, and held to the light, diaphanous — white, except some very delicat arborization of blood-vessels most perceptible at the valves.

Experiment 2d. A full grown rabbit was fed six

In the examined with the exception, the veins situated beneath the mucous membrane are enlarged and their situation and blue colour renders them very easy to be distinguished, on redness of the neighbouring, as much as by all the others.

Upon summing up we may say, that the healthy mucous membrane in the patient is somewhat of a very coarse, in infancy it is of a pale colour, in adult age it is greyish white; during digestion the part of the membrane which lines the stomach, duodenum, and the commencement of the ileum, is of a slightly red tinge.

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hours after being fed and immediately afterwards opened. The stomach contained about two ounces of a brownish mucaceous mass, much coagulated, of a dark colour and specially at the cardiac extremity, were diminishing so

We have then seen that to the naked eye, little, if any vascularity is observable in this tissue. Injected with coloring matter however, we find it the highest grade of vascularity. Blood-vessels become evident ramifying transversely and longitudinally among the fibres of the tissue. Many specimens of this kind are in the Medical Museum.

In distribution of nerves to the intestinal canal, we call attention to the superficial nerve and to single ganglia a number of pathological phenomena. Physiologists, of the present day, are still agreed in describing the nerves into such as are distributed to the

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they approached the pylorus — pyloric region smooth and of an ashy or dull white, without any injection or appearance of repair. The cardiac urine held up to the light, presented a pale red ap-

mote the relations with external bodies, and such as preside over the nutritive functions. The former including the cephalic and spinal or the nervous system of animal life, are possessed of the highest grade of sensibility, the latter, or the nervous system of organic life composed of a ganglionic system or the sympathetic and its branches are comparatively insensible. Supplied as the stomach is, by the pneumogastric, or par vagum, a nerve from the encephalo-spinal mass we find it generally to give immediate warning of the approach of danger, by transmitting painful or unnatural impressions to

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pearance, diminishing as the parts were stretched. No vessels or arborization visible — small intestines empty, and of a very pale red colour. — Cecum, yellowish white — colon, colourless in direct and reflected light. With the exception

the brain. In common with the other portions of the tube, it has also branches from the sympathetic. The large intestine receives branches from the spinal nerves, and like the stomach has in consequence a high degree of sensibility. The sympathetic being distributed to the small intestines, explains the reason of the obscurity often attending diseases of these parts, in which but slight pain is felt, and often no complaint made at the time, although post mortem examinations have exhibited extensive organic changes.

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of one or two very minute ramifications, no arborization was visible.

Although the difference between these two cases is not very great, it is yet sufficiently so to prove our position, viz., that the appearance is made to vary by the process of digestion enough at least to entitle the shade to different names.

That no exhalent vessels have yet been demonstrated on the digestive mucous membrane, is doubtless owing to the imperfection of our means for conducting such an enquiry. Analogy would lead us positively to the conclusion of their existence. In its normal structure, the skin, we find not only sebaceous glands corresponding with the mucipaious glands, but also another and peculiar set of vessels destined to convey the perspiration to the surface, and when excited by a irritant throwing out a large quantity of a fluid of a decidedly serous character. The moisture of the breath would also seem to indicate distinctly their existence in the pulmonary membrane. We are aware that it has been suggested that this is from the mucous glands, and that the watery discharges in many of the local affections, are the product of the same organs.

The presence of absorbent vessels is easily shown. They exist as we before remarked, as a part of the structure of the villi, and in the small intestines receive the name of lacteals. They take up, and transmit, and are to a certain extent, instrumental in the formation of chyle.

Without attempting a formal dissertation on the physiology of the mucous membrane, we may still be allowed to hint at the important part performed by it, in the digestive process. A notice of the various theories, which have been proposed on this subject, would of itself afford matter sufficient for an essay. Restricting ourselves to the most recent observations, it is sufficient to assert that for the first preparatory process, or the formation of chyme to be accomplished, it is necessary that the food taken into the stomach should

stratum after stratum, to be brought into immediate contact with the mucous surface of the organ in order to receive a new character and be prepared for further changes. The same remark applies to the conversion of chyme into chyle in the small intestines, and the not less startling revolution in the contents of the large. It cannot occasion what takes place on these occasions by the chemical operation of any secreted fluid, or the action of any particular set of vessels. The processes are complex ones, on the performance of which, we know the vital action of the mucous tissue, and its direct and intimate application to the contained ingesta, is the *sine quâ non*. The power which the mucous membrane has of coagulating certain fluids, is well known, and advantage taken of the fact for culinary purposes.

Having thus far been employed in considering the digestive mucous tissue in its normal or physiological condition we will now proceed to study it in its abnormal or pathological state.

The intestinal canal may become the seat of disease either primarily or secondarily. In the first case, as a consequence of the direct application of noxious substances to its mucous surface, or of their circulation through the medium of the system at large; and in the second, as an affection consequent on that of some other part. Any attempt at enumerating the first order of causes would lead into unnecessary detail; nor can we indulge in speculations on the second, or the sympathy of the bowel with other organs; though the subject is one of engrossing interest. The paramount importance recently ascribed by Broussais and his followers, of the physiological school to affections of

the primæ viæ, in all diseases generally regarded as constitutional, has given rise to many observations followed by various conclusions on the part of Medical men in France, Great Britain, and in our country. It is not our design to insist in this controversy, though fully entertaining the belief, that of all organs, the intestinal canal and especially the superior or gastric portion, is peopled by sympathies so diversified and numerous, that its derangement may perhaps involve that of all the others.

Physical changes in the Gastro-intestinal Mucous Membrane.

Of alterations in colour.

Inflammation of the mucous membrane is attended by the usual phenomena of heat, pain, redness and swelling. These may all disappear immediately at death as they are known to do on the superficies of the body. At that time, the local irritant which caused

the afflux of fluids to the part causing it act, its effects cease with it by the blood returning to the general circulation. This however not occurring, in vait assumes alterations for the most part proportional to the length of time during which the congestion has been advancing and to the habits of the individual and constitutional peculiarities.

The difficulty has consisted in distinguishing, how far certain changes in the appearance of the mucous membrane, are the consequences of temporary irritation and mere excitement of the nervous tissue, or evidences of fixed structural alterations, on which the other morbid phenomena are supposed to depend. Among the diagnostic signs of morbid alterations of the mucous tissue, none has of late excited so much attention as that depending on colour. It cannot be doubted that for want of sufficient data

on this subject, the zealous investigator of the causes of disease, has in his autopsic examinations often been led into error, or foiled in the object of his search. Indeed, such has been the uncertainty existing with regard to it, that it has been mooted whether inflammation in the intestinal canal, can be demonstrated by the phenomena apparent on dissection. Led by analogy, many able observers especially of the modern or Broussais school, were induced to regard redness of the intestinal mucous tissue as evidence of inflammation. To many those however, who were sceptical on this point, Mr. Fellowes appears to have advanced farthest in his opposition. From examining the bodies of some few criminals who had been hanged, and of persons drowned he came to the conclusion that those signs ordinarily attributed to inflamma-

tion existed where this process could not be supposed to have taken place. To Mr. Tellowly's inquiries however a satisfactory reply is not wanting. Happily the experiments of Bichat and others led us to anticipate the very results at which he arrived. These experiments went to show, that if the general circulation be arrested, as is the case in asphyxia from hanging or drowning, a congestion of the capillaries was the consequence, and from the vascularity of the intestinal tube, we are not to wonder that it should be involved in the general distress. Let atmospheric air for a time be refused access to the lungs; these organs then wanting their accustomed stimulus, and being unable to perform their functional duty in the chemical changing of the blood, will produce a consequent arrest of the fluid in the capillaries of the skin, and mucous

Membranes. This is seen in those in danger of suffocation. Here however the appearance is removed by a removal of the obstruction, and a return to free breathing. But if asphyxia be suddenly induced, and constantly kept up, until the subject be destroyed, we shall have a different result, and the very appearances which all Tellowly in some of his cases has designated. In some of his cases, we recognize what would be almost considered as marks of true inflammation. Nor, need we be surprized at this, if we for a moment reflect upon the influence which the stronger emotions, or passions of the mind, exercise over this rail of our system, and the debauches to which most criminals have been previously addicted. That however we may not fall into the same error with all Tellowly, let us see by what marks we are to discriminate between passive congestion, and

true inflammation.

In conducting an examination for this purpose, it will be proper that the mucous tissue be detached. We shall then sometimes find, that the redness is owing to an injection of some of the other coats of the intestine, generally in such cases it is the sub-serous; so that frequently the red appearance of the mucous coat is owing to its semi-transparency. In this way, M. Senn thinks we may account for a great number of cases of uniform redness described by authors, who were led into error by their too superficial examination. When the colour is uniformly red, and especially where it appears slightly red, it will be necessary to examine with great attention.

In the greatest number of cases, we find that the redness is not uniform, but it is owing to the injection of the vessels, principally of the

capillaries of the mucous body. Its ramifications may be traced by the eye when held up to the light, and this condition will then would term red injection, arborization, more or less vivid, intense.

The true difference in the appearance of congestion and inflammation is this, that in the former, the colour is more equally diffused throughout the organ in which it is seated, and does not present the peculiar stellated appearance of the latter.

In the early stage of inflammation, the bloodvessels of the membrane will be found enlarged and distended with blood. When placed between the eye and the light, it presents either numerous vascular networks or a uniform red tint, sometimes rather more or less brown. This colour according to Mr. Hodgkin is not dependent on the duration of the process since

it may be created in the course of an hour by conveying a corrosive poison into the stomach of an animal. Mr. Fox found the mucous membrane of animals who four and twenty hours before had swallowed euphorbium, of a very dark red brown. Often a considerable tract may be of a uniform red colour, varying from vermilion to the deepest brown. The red may gradual, or terminate in an abrupt edge. Again we may find, round or irregular circumscribed red patches, in the intermediate spaces of which, the membrane is white. After a certain time, if the inflammation be very vivid, to the red succeeds a uniform deep slate colour. If the membrane be now detached, and held before the light; the vessels appear injected, and innumerable black spots are seen as it were studding the surface, formed apparently from matter deposited on it. Mr. Senn cautions

against confounding it with the blackish colour, which results from the contact of sulphuretted hydrogen gas at the time when putrefaction commences. By way of distinguishing them, we are told, that when the greyish tint depends from the beginning on putrefaction, it slightly approaches a deep green; it is uniform, and we do not find it flecked with black; other signs of putrefaction are also evident. As a further test, we are directed to plunge the parts in water, when if the colour is the product of inflammation, it is almost entirely effaced by a prolonged stay in the fluid, which does not follow when the colour has the other cause.

Another appearance common in inflammation, is a dark red, blotched, mottled appearance. So diversified indeed are the appearances which inflammation gives rise to, and so numerous are the applications which different writers

give to the same thing that we may see what the constituent made, when speaking of the membrane in its natural state.

Of Alterations in texture and consistence.

Inflammation of the digestive canal being permitted to go on from neglect, mal-treatment or from suitable remedies proving unavailing gives rise to other phenomena. The first we shall notice is that of softening. This may occur in any part of the canal, though its existence in the stomach has been most treated of by authors. It is alike the result of chronic and acute inflammation and may occur after a very short time. In a dog, on which Brodie experimented, a remarkable softening was produced in a half hour, by the injection of a few grains of corrosive sublimate. Any attempt at removing the membrane while in this condition, will cause its lesion; it may without difficulty be removed by scraping, or

floating the affected part in water.

In making the examination, if we view the gut from without, we find in it no altera-tion. When opened however and narrowly examined one of two appearances presents itself. We shall find the softening attended by a pale white, or which is more common, a greyish, blue-ish, or blackish, and sometimes a reddish colour. If the latter be the case, no difficulty will be found in the investigation, but should the affection be very limited as often happens and consequently, it is all to be overlooked.

M. Louis has published in the Archives Generales de Medicin a very interesting paper "on softening with extenuation and destruction of the Mucous Membrane of the stomach". We cannot do better than briefly to lay down the following deductions from the twelve cases there given.

In cases of ulceration, the edges are smooth and perpendicular; in softening, a well marked depression alone was observable, in the point of contact between the portion of the mucous coat, which presented the appearance in question and that surrounding it.

The membrane in those bounds corresponding with the lesion, was pale, extremely thin and soft, and transformed into a coat of glairy, pale, semi-transparent mucus, or the thickness of the mucous lining of the colon. A caution is here thrown out against the belief that the mucous coat is entirely removed, the appearance being deceptive from its resemblance to the vascular structure beneath. No mucus was to be found on the parts.

When it occured under the form of broad and narrow bands; it was almost equally spread over the whole surface of the stomach: when, on the contrary, it was in one patch, it occupied the

greater extremity, was usually confined to the great sac and sometimes extended nearly from the cardia to the pylorus.

With two exceptions, the sub-mucous tunic was healthy, and of a proper firmness: in certain cases it seemed denser than common, but the difference was not sufficiently obvious to enable Mr Louis to affirm any thing positively on this point. The muscular coat was softened under the same circumstances as the sub-mucous.

Extenuation with slight softening—thinness, with considerable softening of the mucous membrane—its destruction, as well as that of every tissue of the stomach to a certain extent, with the exception of the peritoneal coat were sometimes met with in the same individual, exhibiting the progress of spontaneous perforation of the stomach. Throughout the remainder of its extent, the mucous membrane presented certain peculiarities.

In four cases, it was of a red more or less distinctly marked, and in two others of a greyish colour. Adjacent to the softened part, the membrane was sometimes of a vivid red, and as thin as the part so disorganized. At other times, it was found tuberculated or ulcerated.

The membrane lining the colon generally deviated in colour from the healthy standard, being either pale, or a more or less vivid red; wherever this occurred it was found softened or ulcerated. In ten of the twelve cases, the lower part of the small intestine was ulcerated.

In the symptoms and progress, as detailed by Mr. Louis, we should judge that no material difference exists between this affection and that where the stomach is perforated, except that in the latter case, peritonitis is more likely to supervene.

Nearly allied to softening is ulceration;

a process to which all parts of the tube is liable. It may occur in the stomach, the large or small intestines, though observation shows the lower portion of the ileum, to be that in which it most frequently occurs. And here too it is they are much more approximated than in the stomach or small intestine. Andral records as the result of the dissections of seventy one subjects, that in ten, ulcers were found in the stomach, in nine, in the jejunum, in thirty eight, in the lower part of the ileum, in fifteen, in the cæcum; and in eighteen, in the colon.

We are nowhere informed of the length of time, that inflammation may exist before ulceration takes place. This can never be determined, since it must be dependent on the cause, the age, and peculiar idiosyncrasies: gradually induced, it may be slow in its progress, and in some persons, is manifested a power to resist

ulceration to a remarkable extent.

Ulcers may exist of various sizes, from the smallest lesion to several inches. M. Andral has seen the mucous membrane for six fingers breadth above the cæcum entirely removed. In shape they also vary observing no rules in this respect. The membrane in their vicinity may be either in a state of health or disease; frequently, its borders are elevated and indurated, resembling the syphilitic chancre; at other times no such appearance is presented.

Ulceration may first take place in the mucous body, as is the case from the application of corroding substances. More gradually induced, it would seem to commence by disease of the follicles or mucous crypts. This M. Louis thinks has not been sufficiently insisted on. "We have seen them" says he "in the ordinary state more or less apparent, but

sufficiently developed; yet it is very common to find them distended with mucus and giving to the membrane a granulated aspect; this is observed especially in the duodenum, and coincides with phlogosis of the gastro-duodenal mucous membrane. If we then compress them slightly, we see the fluid oozing from their summits. At other times, when the inflammation has been rapid, we find them more distended by a fine hue or surrounded by a bright red circle, and finally when the inflammation has been chronic they contain yellowish matter analogous to that of tubercles." The same appearance exists when we attempt to remove the mucous body of the colon; the crypts containing a small quantity of whitish or greyish matter, remain. To these remarks, it has been opposed, that if the follicles are the points at which intestinal ulcers commence, then should they be

more frequent in the duodenum, as the follicles there exist in greatest abundance.

Ulceration having existed for some time in the mucous membrane, if not arrested, may involve the other tissues. In this case the ulcerative process extends itself to the sub-mucous cellular coat, which it gradually removes; or, we are told that this tissue will take on a morbid action, and after undergoing several changes with regard to colour and consistence, at length sloughs away. Each of the other membranes in turn suffers the same fate, until finally a communication is made between the cavities of the intestine, and abdomen, or adhesion to some of the surrounding parts is formed. A great variety of cases of this nature, is recorded by Gerard, Travers, Crampton, Chardel, Carmichael Smyth, Pinel, Louis, Abercrombie, and others. From the writings of these gentlemen,

and particularly the latter, we collect the following facts.

Occurring in the stomach, the disease is very insidious, and deceptive, frequently going on to a fatal issue without any symptoms to indicate its existence.

In its progress, it may be rapid or very slow. One first occurs from the application of corrosive poisons and the like; the latter where the cause has ceased to act after having established a morbid process.

Cases are on record of persons having survived for years after the first symptoms of the gastric affection had come on, with occasional remissions and intermissions from all pain. Patients thus situated have generally died very unexpectedly, and no suspicion of the true cause existed, until the dead body was opened.

Again, we are informed of other cases

where in a moment, the patient having previously enjoyed perfect health, has been seized with alarming symptoms and in the course of a few hours has sunk. Here post mortem examinations have shown the wonderful effect of an unknown exciting cause.

These latter were the terminations of acute, the former of chronic inflammation.

The perforations may be single or numerous, - large or small. Occurring in the stomach, the smallest will prove fatal; but when in the intestinal canal, we are told of considerable portion of the gut being removed before death has supervened.

Mr. Louis, whose high authority we have before used, records seven cases of perforation from acute enteritis, occurring in the small intestine, attended some with regular paroxysms, and all with febrile symptoms, more or less

developed.

The parts surrounding a perforation, are in appearance as from the ulcer of the mucous coat alone.

The mucous membrane is ulcerated to an extent greater than that of the tissue beneath.

Pimples and pustules are occasionally found covering the mucous membranes. Closely examined, erosions are sometimes seen in their summits, these spreading, may produce ulcers.

Some Physiologists, as John Hunter and others, have probably mistaken these perforations by the ulcerative process, for erosions produced by the gastric juice.

The application of this part of our enquiry to medical jurisprudence cannot be expected of us on this occasion. It is sufficient for us to point out the danger of confounding these organic changes, the consequence of internal, and to us

often unknown processes with the ulcerations produced by corrosive poisons. Ignorance of this distinction has led physicians to accuse the innocent of the crime of poisoning, in cases where death had been the result of spontaneous perforations.

For a long time, gangrene was considered as frequently occurring in the intestinal canal. Recent authors have thought otherwise, and supposed that many of the cases related as such, were confounded with other phenomena of inflammation, and particularly with softening. Sometimes however it is met with, and more frequently in the end of the ileum, and cæcum than in other parts. It is occasionally seen in the laminar tissue, which forms the floor of an ulcer, and is then thickened, black, or of a dirty greyish colour, and of a pulpy consistence such as is remarked at the surface

of wounds affected with hospital gangrene. In other instances, gangrene is the direct consequence of inflammation of the mucous membrane, and the eschar which results, when shaken off, leaves a sore.

Of Thickening. Inflammation of short duration, unless of considerable violence, is seldom productive of increase of volume in the mucous membrane. If, on the other hand, it be acute or continued for a considerable time, this may happen. These different states give rise to different appearances in the thickened part; thus, if it be caused by acute inflammation, there is accompanying it, the dotted redness, and other signs of inflammation; if by chronic, these will be wanting, and the elevated part will be white. Thickening is a termination by induration. The gut may be thus affected in a great portion of its extent, or it

may exist on a small space. When it is thus limited, the thickened portion is elevated above the surface, and commonly either of a round or oval shape. Mr. Mann has found the nucleus of the tumor have a three times natural thickness and in chronic diarrhœa it is not unusual to find the lining membrane of the colon, as thick as the four lowers latera together.

Still the authors one and of the subject, mention this stat of the mucous membrane, though from the nature of the parts, we strongly suspect that in many if not a majority of cases, a careful examination would have proved its seat to be in the subjacent cellular tissue an alteration which we know this tissue to be liable to in all parts of the body when under the process of inflammation.

After thickening, it might be noticed

speak of morbid thinness, but as we have already had occasion to allude to it, in a manner sufficient to explain its nature, we shall forbear from further remarks on the subject.

Besides the several appearances mentioned, we have sometimes on the mucous surface, conical growths, of soft consistence and of four or five lines in thickness; these are found more commonly in the large intestine, though occasionally they exist in other parts.

M. Lerminier and Andral have observed white conical elevations, of half a line in height, as broad as a lentil at base, and resembling at their summits an exact resemblance to the pustules of small-pox. They were generally found in clusters, with the intervening mucous membrane, sometimes red, sometimes brown. In upper portions of the duodenum and the transverse arch of the colon,

were the only places in which our authors met with them. In the colon, elevations of a different character more frequently presented themselves. Conical as the former, and sealed like them in the mucous membrane, their base is much broader, their elevation greater; they terminate in a pointed summit; they are of an intense cherry red and the surrounding membrane is somewhat injected. They are of opinion, that the nature of these bodies, is more easily understood, by comparing them to the small tumours of the skin, known by the name of Boils.

Alterations of the fluids of the Digestive Mucous tissue.

Inflammation of course may, as the functions of the Mucous Membrane. The mucus will lose its consistence, and become like serum. Under this form, instances are related of enormous discharges occuring in the several bowel affections, and particularly that of the Indian cholera. Morgagne

gives an example of a Woman, who in a single day, discharged by the anus forty pounds of limpid serosity.

At other times the mucus acquires great elasticity, hardens, and puts on a membranous shape. Its discharge in this form has often given rise to the false supposition of portions of the intestine being removed, or to the belief that a true membrane has been formed in the canal. Examinations, however, have shown them to be devoid of no vascularity, but a mere condensation of the fluids, which have been effused by disease. In colour, they are yellowish or greyish, and sufficiently consistent to allow of being raised; when removed, the subjacent tissue generally appears red and thickened.

Other fluids are also secreted on the inflamed digestive mucous membrane; as in entero-mesenterica, it is not uncommon to find swelled patches

covered with a bloody, reddish paste, seemingly a mixture of blood and mucus.

The mucous membranes are very liable to suppuration. The pus is ordinarily thrown out upon the free surface, though it occasionally happens that it appears at the attached, and an abscess is formed. Sometimes numerous points of purulent matter are observed in the meshes of the cellular coat, the effect of inflammation in the mucous tissue. Some few cases have been recorded of abscesses formed in the stomach, and discharged by vomiting.

Of Cohesion of Mucous surfaces.

It has been made a question whether the mucous membranes do ever cohere in such a way as to obliterate the intestinal canal. Dr. Bishopp on the affirmative, has published in Vol. 4 of 1825, the London Med. Repository, several cases to establish this point. He adduces apparent

examples of strangulated hernia as proofs, and states that the canal was entirely obliterated. Such obliterations not unfrequently occur in the urethra, and that not by the coherence of the margins but by a deposition of fibrine in the cellular tissue and body of the mucous membrane and this may have been the case in the instances cited by Dr. Dissington; at least evidence on this point is not adduced.

(7) Intro-susception.

Intro-susception is a thing frequently noticed by writers, and of frequent occurrence. It is often found in those who have died of disease, in which the bowels have been involved, and where there has been spasmodic action of the bowels. In many cases it occurs at the moment of death, and where it could be neither a cause, or effect of inflammation. They may exist singly or in numbers in the same body. Usually, the upper part of

the intestine is invaginated in the colon. They occur more frequently in the ileum. Heidenreich and Barthez saw the cæcum carried into the ileum; Hecker, the transverse arch and descending colon into the sigmoid flexure; and Bendz has cited an instance of invagination of the rectum in a man who died of obstinate constipation and great vomiting. "Indeed," says Ingal, "the veracity of the former author, who states that he saw the duodenum invaginated into the common biliary duct?"

Having thus designated the physical appearances of the intestinal mucous membrane, as presented to us after death, we shall proceed to notice briefly the alterations in other tissues and the functional disturbances consequent on the morbid alteration of the lesion. First then, of the mesenteric glands, and the glands secer-

vient to digestion.

As a general rule it may be laid down, that, all violent or protonged irritations of the digestive canal are followed by derangement of these organs. Thus, after cholera, diarrhœa, and dysentery, especially of the chronic character, the mesenteric ganglia is found injected and enlarged, or thickened, or occasionally ulcerated. The same remark applies to alterations of the liver and pancreas. In most cases of hepatic disorder there has existed prior irritation of the gastro-intestinal surface. A knowledge of this fact will of itself guide us in the treatment of acute and chronic hepatitis, the details of which we cannot of course follow out here.

Of perhaps as frequent occurrence as the disorders just mentioned, are the deranged actions in other divisions of the general mucous system following the morbid condition of the digestive portion. Thus, what is more common than depraved function of the genito-urinary mucous membrane,

vinced in disordered renal secretion, and in p-
maies in uterine irregularities: or deviations
from the natural state of the mucous pulmonary
surface, as in pertusses, asthma, certain kinds
of catarrh. All these are often met with as
effects of impaired digestion, and of course, of a
morbid action of the gastro-intestinal mucous
membrane. But with no part of the body does
the tissue in question, hold such community of
office, and resemble so much in structure as the
skin. The cutaneous surface is often a faith-
ful mirror reflecting the condition of the di-
gestive mucous - as we see not only in the
exanthemata, but in various chronic affections,
such as herpes. A knowledge of the nature of
this chain of morbid actions, enables us to break
it successfully, by a removal of the first and
most important link.

Of the functional and vital disturbances, indicating
and accompanying disease of the digestive mucous
membrane.

Evidences of this state, we may mention pain referred to the part habitually affected, spasmodic and irregular action of the muscular coat, of the abdominal muscles, and of the voluntary muscles, irritation and pain in parts of the membrane remote from the seat of disease, disorder in the nervous and sanguiferous systems.

Pain. When speaking of the distribution of nerves to the alimentary canal, we alluded to the difference of sensibility in different parts. Nor does a uniformity always prevail in this respect. Thus, though the stomach is in the main a wary sentinel quickly giving cognizance of the approach of danger, it is sometimes found otherwise. In addition to the cases alluded to, when treating of spontaneous perforations of that organ, we may observe that Gastritis is sometimes so insidious in its approach and progress, that pain in the ball of the great toe, or some other remote part, is the only symptom we have indicative of disease. In forming our diagnosis in the gastro-enteritic

affections, a difficulty sometimes arises from the obscurity of the symptoms, and here we may remark upon the advantages, derived from pressure in ascertaining the seat and nature of the complaint. Pain may arise from two causes, from spasm, as in gastralgia, and from inflammation. Pressure is here productive of different effects; if it be from the first, relief is afforded; but if from the second, the distress is augmented. It not unfrequently happens, that the patient himself feels no pain, and when interrogated, will answer accordingly, but when the hand of the physician is made to press upon his epigastrium, his exclamations soon afford evidence of his suffering.

Pain is not a necessary concomitant to inflammation of the mucous tissue. Post mortem examinations have often shown the ravages of disease upon the small intestine, of which there was no indication during the life. This is owing as we have before stated, to its being supplied in

the greater part of its extent by the organic nerves alone. The parts of the canal especially sensible in a morbid state, are the pyloric region, duodenum, iliac region corresponding to the lower part of the ileum, and the arch of the colon.

We often find disorder of central parts of the digestive mucous canal, indicated by irritation of one or both extremities, as itching of the nose from the irritation of worms, redness and pain of the throat, and itching of the anus.

The mucous surface is to a certain extent, a surface of relation, by which the animal is apprized of the presence of bodies either fitted for nutriment, or calculated to injure or destroy. In the healthy state, and during the natural process of digestion, impressions made on the mucous surface, are speedily evidenced by increased action of the muscular tissue, constituting the peristaltic motion, some excitation of the sanguiferous system, and of the brain and

senses. The residue of digestion, arrived at the lower part of the canal, stimulates the mucous tissue to call into simultaneous action the muscular coat of the intestine, the abdominal muscles and diaphragm, for the purpose of defecation. Abnormal, or violent irritation, is followed by a correspondingly violent action of all those organs which, as we have just seen, are associated with it in healthy function. Hence in the violent pain in spasm, in gastrodynia, colic, cholera, and dysentery, we recognize the irregular action of the muscular system, not as a disease of itself, but as a symptom, and effect of the morbid state of the mucous surface.

Effects on the nervous and sanguiferous systems.

Were we to enter fully into this part of our subject, we would protract our essay too far. It is impossible to study any of the grander phenomena taking place in the digestive system, without observing how constantly the brain sur-

ticipates in the stimulations applied to this surface. We feel it daily in health, digestion and all are at some time or other made sensible of, in the prompt effect of vinous or alcoholic stimuli taken into the stomach. The nervous connexion between this latter viscus, and the brain, and between the large intestine, and the spinal cord, serves to explain these prompt sympathies. A more obscure, but perhaps more permanent impression, is made on the encephalic mass, by a morbid condition of the small intestines, through the sympathetic. Those desirous of investigating this point, may instructively consult Broussais' Physiology. Various irritating poisons act on the spinal marrow and brain, in virtue of anterior impressions made on the digestive mucous surface, without any intermediate organic change or absorption. But the evidences of mucous irritation, are often met with in the muscular system, both of organic and animal life. In the first, the heart is brought into morbid action,

constituting what is often called fever - a circumstance exceedingly common after irritating, or long unchanged ingesta, in the alimentary canal. In the second, convulsions, partial and general are frequent. The muscles being obedient to the brain, we can easily understand how irritations, transfered to it from the mucous surface, should be the cause of violent spasms and convulsions, as in worms, poisons, &c. Hence we can hardly be surprised, that Broussais and his followers should make gastro-enteritis the origin of all fevers, the bilious, the adynamic, the ataxic, the mucous, the ardent, the singultous, the anglicus sudor, &c.

We need scarcely mention that this is a controverted point, nor will it be expected that we should here take part in the debate. As ordinary phenomena however, we all know the effects of ingesta taken into the stomach, or of constipation. Either will show its effects in the accelerated pulse, and the gloomy irritable

mind. A knowledge of the latter made Voltaire observe that "many a war had been waged, because a minister could not procure a stool," and from high authority the wooing swain is taught, his time to choose, the inviting smile to win.

We here close our remarks on the Digestive Mucous Membrane, happy should they please.